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Barrow Coastal Storm Damage Reduction Study

August 23, 2006

Presented by:

**U.S. Army Corps of Engineers
North Slope Borough**



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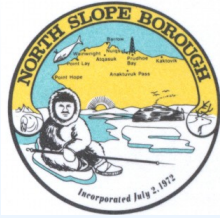


Meeting Purpose

- Update community on study progress
 - Results of Technical Studies
 - Solutions being considered
 - Possible impacts identified
- Receive community input on
 - Level of protection
 - Potential problems with solutions
 - Area to be protected



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Results of Technical Studies

- ***Bluff is eroding***
- ***Beach is generally stable:***
 - ***Beach loss in 1960's appears to be primarily due to heavy beach borrowing for upland infrastructure fill***
 - ***Beach nourishment measures have been dropped from detailed consideration***
- ***Portions of community susceptible to flooding***
- ***Focus now is to provide:***
 - ***Bluff protection in Barrow***
 - ***Flood damage reduction at lagoon and Browerville***



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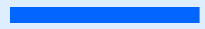


Bluff Lines - 1948 to 2003



2003

Bluff retreat is approximately 1.1 feet/year



1948

University of Colorado study found 1.2 feet/year





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Shorelines - 1948 to 2003

2003

1948



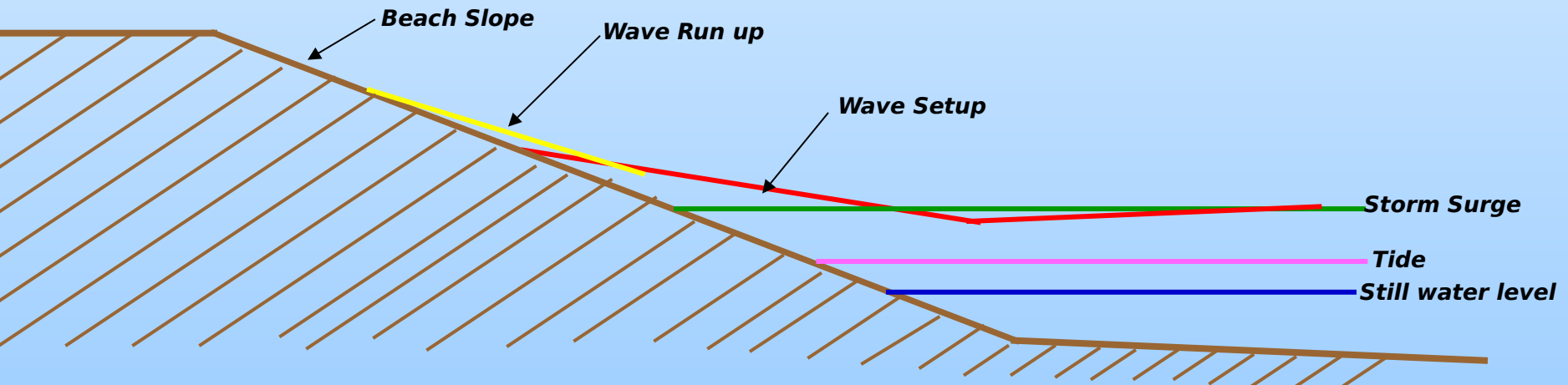


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Factors Contributing to Water Elevation

- ◇ **Maximum Tide** - rising and falling of water primarily due to sun and moon acting upon the rotating earth
- ◇ **Storm Surge** - a change in water level induced by the passage of a low pressure system and/or by strong winds piling water against the coast
- ◇ **Wave Set Up** - a change in water elevation shoreward of the breaking wave
- ◇ **Wave Run Up** - the rush of water up a beach after a wave reaches the shoreline





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50 year Storm Event - **8 feet = Tide+Surge+Set Up** **13 feet = Tide+Surge+Set Up+Run Up**

8 foot contour = tide + surge + wave set

13 foot contour = 8 foot contour + run up

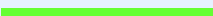
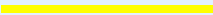




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100 year Storm Event - **10 feet = Tide + Surge + Set Up** **15 feet = Tide + Surge + Set Up + Run Up**

-  10 foot contour = tide + surge + wave set up
-  15 foot contour = 10 foot contour +





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Proposed Solutions

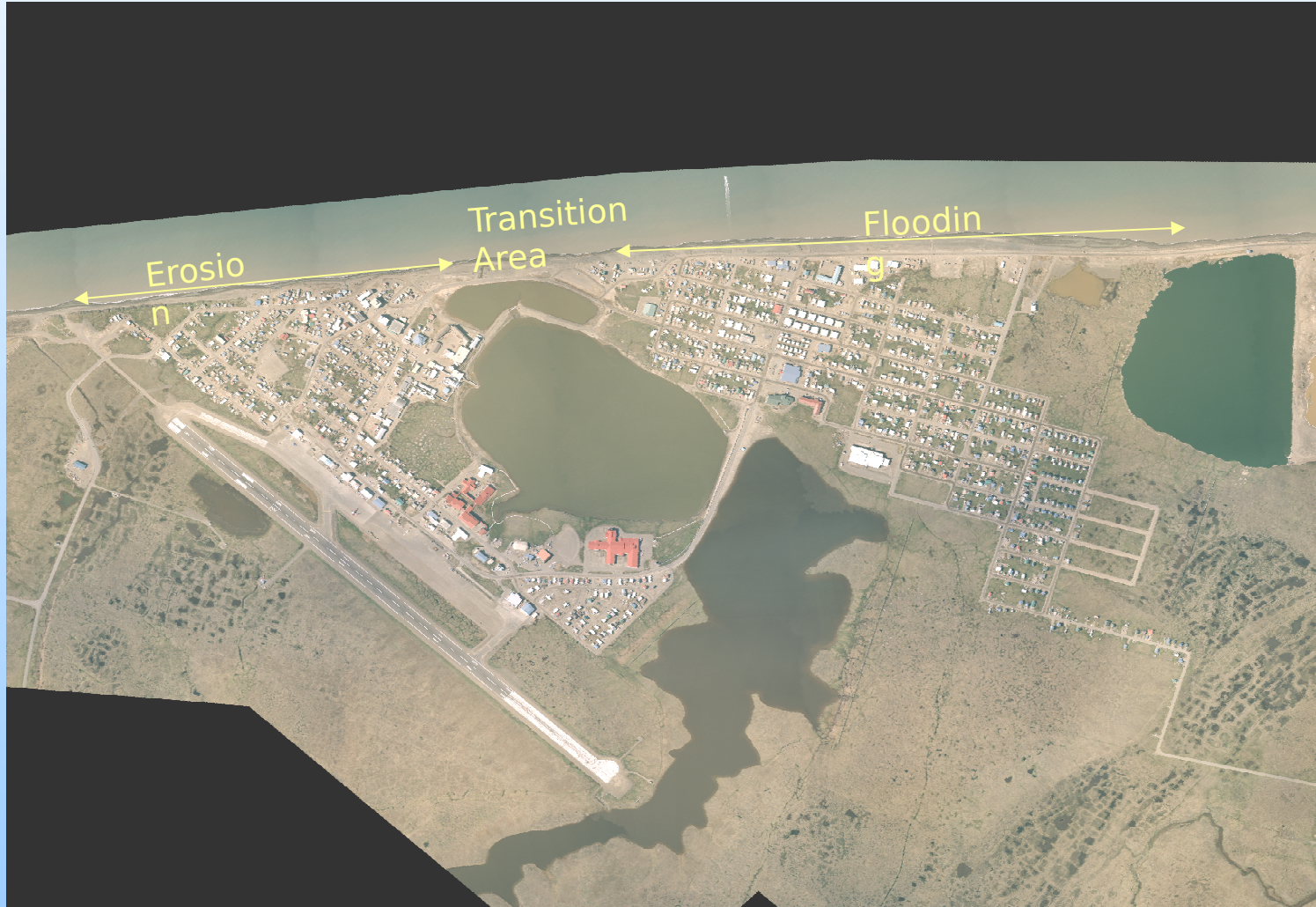
- Erosion
 - Revetment along the bluff
- Flooding
 - Dike along low lying beach



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Shoreline Problems

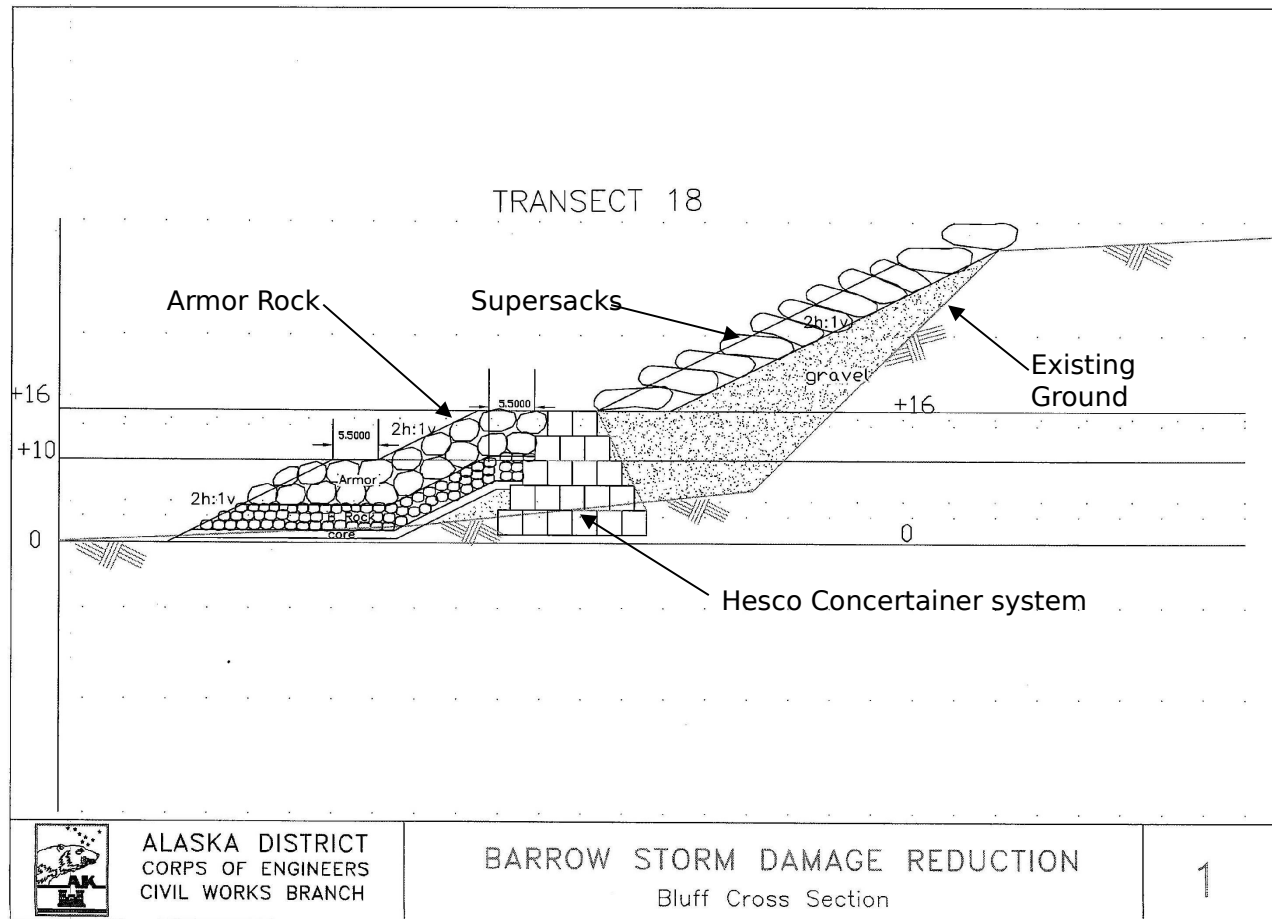




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Example Revetment Cross Section





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Example of Rock Revetment





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Another Example of Rock Revetment

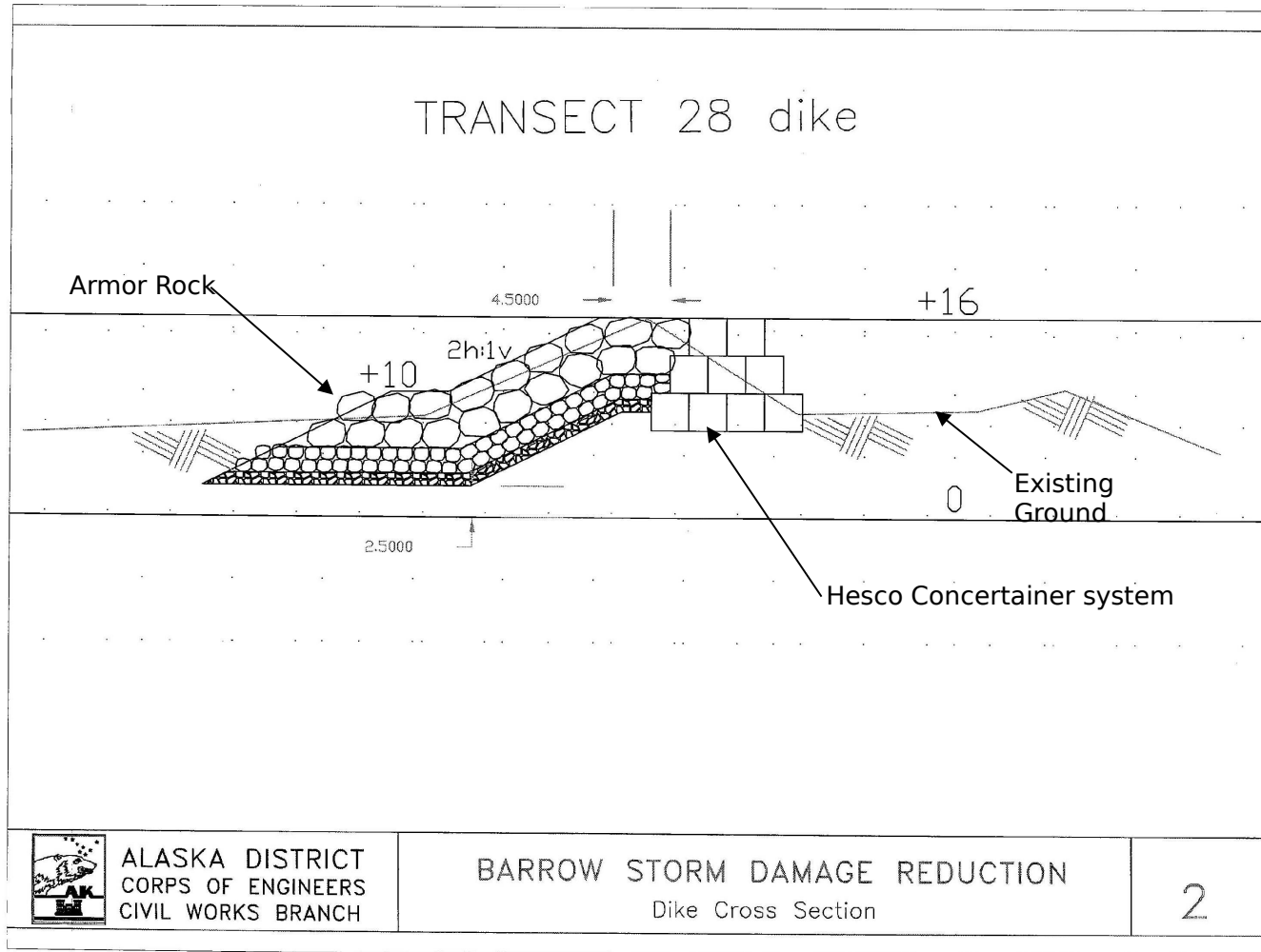




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Dike Cross Section





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Revetment and Dike Footprint

Note beach access points





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Possible Impacts

- **Rock revetment and dike would:**
 - **Have minimum impacts to beach habitat and wildlife**
 - **Protect water supply dam, utilidor, structures, and the Utqiavik archeological site**
 - **Reduce utility outages**
 - **Provide positive social and economic effects**
 - **Narrow existing beaches, limit beach access, and be a permanent visual block to the sea (temporary berms already there)**
 - **Not cause beach starvation down current**



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Potential Costs

• Project Costs

- Bluff Revetment \$21-31 million
- Coastal Dike \$27-35 million
(Lagoon & Browerville)
- Combined Project \$45-65 million

• Cost Sharing

- Federal Share about 60-65%
- Non-Federal Share about 35-40%



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Non-Structural Measures

- **Relocate Structures/Facilities from Damage Area**
- **Relocate Roads to Less Vulnerable Locations**
- **Relocate Utilidor and/or Other Utilities**
- **Join/Participate in Federal Flood Insurance Program**
- **Develop/Adopt Flood Hazard Mitigation Plan**



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Project Information

www.poa.usace.army.mil

- Click on **Civil Works and Planning**
- Select **Barrow Coastal Storm Damage Reduction**

Phone Contact: Lizette Boyer (907) 753-2637

Forest Brooks (907) 753-2627



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Comments?

US Army Engineering District, Alaska
CEPOA-EN-CW-ER (Lizette Boyer)
Elmendorf AFB, Alaska 99506-0898



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***The following slides are
only for answering
questions and not part of
the slide presentation***



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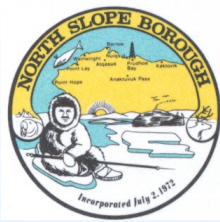


Meeting Participants

- **Michael Stotts - NSB Project Administrator**
- **Forest Brooks - Corps Plan Formulator**
- **Dee Ginter - Corps Hydraulic Engineer**
- **John Oliver - Consultant/Hydraulics**
- **Ridge Robinson - Consultant/Economics**
- **Kurt Keilman - Consultant/Economics**
- **Dennis Blackwell - Corps Cost Engineer**



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Economic Data Development

- **Likely benefits to the community include:**
 - ✓ **Storm Damage Reduction to:**
 - **Buildings - both business and private**
 - **Utilities - utilidor infrastructure and reduction in utility outages**
 - **Water supply lagoon - protection of Barrow's water source**
 - ✓ **Erosion Control for:**
 - **Shoreline**
 - **Bluff**
 - ✓ **Foregone Management and Maintenance to:**
 - **Road repairs**
 - **Berm building**



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Economic Data Development

■ **Other Benefits Categories:**

- ⇒ **Recreation activity**
- ⇒ **Subsistence activity**
- ⇒ **Life, health, and safety considerations**
- ⇒ **Emergency services**
- ⇒ **Cultural impacts**
- ⇒ **Potential changes in income and employment**



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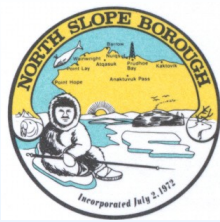


Gravel Source Impacts

- **UIC Pit.** Commercial pit is preferred, if quantities of sufficient quality available at time of construction.
- **Point Barrow.** Negative affects to Nuvuk site and shoreline bird and fish habitat. Dropped from detailed consideration.
- **BIA site.** Pit excavation would have adverse affects to tundra wetlands, nesting bird habitat. No Steller's eider nests in area. Partial mitigation because of winter excavation. Back up plan if existing commercial pit gravel is unavailable.
- **Cooper Island.** Gravel extraction could de-stabilize the barrier island, cause ecological changes, affect bird habitat, and black guillemot research. Summer barge haul routes to Barrow pass bowhead whale feeding grounds. Winter ice road routes could affect polar bear denning areas. Dropped from detailed consideration



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Feasibility Study Activities

Completed to Date

- **Identify existing & future without-project conditions**

Summer 2006 thru Winter 2007

- **Evaluate erosion & flood damage reduction measures**
- **Identify a plan that best meets National Economic Development criteria, while being environmentally acceptable**
- **Identify and evaluate other plans, particularly any plans supported by the local government sponsor**

Winter-Spring 2007

- **Prepare Draft Report/EIS, including a tentatively recommended plan**

Spring 2007 thru Winter 2008

- **Distribute Draft Report/EIS for public review**
- **Revise documents based on comments**
- **Distribute Final report/EIS.**